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COVID-19 and the Stock Market

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A New World Post COVID-19

Lessons for Business, the Finance Industry and Policy Makers

edited by Monica Billio and Simone Varotto

COVID-19 and the Stock Market

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Abstract When disaster strikes, the weak suffer mightily, the strong only slightly. That is the lesson from stock market reactions to COVID-19. Strong firms had a robust financial position, advanced environmental and social performance, and were not severely exposed to social distancing and lockdowns. Firms with significant international exposure suffered more, at least at first. The ultimate effects of policy interventions, including those by central banks, have yet to be revealed. The market recovery in the second quarter of 2020 is like a patient recovering from COVID-19: hopeful but still uncertain. Managers and policymakers should project the future with great caution.

Keywords Stock markets. Tail risk. Industry sectors. COVID-19.

Summary 1 Introduction. – 2 Overall Stock Returns Over Time. – 3 What Makes Firms Resilient Against Tail Risks? Learnings from COVID-19. – 4 Policy Interventions and Stock Price Reactions. – 5 What is Behind the Exuberant Second Quarter of 2020? – 6 Implications for Business and Public Policy.

1 Introduction

The outbreak of COVID-19 took the world economy by surprise. The topic “infectious diseases” was ranked number 10 in terms of impact in the World Economic Forum’s Global Risk Report 2020, published on January 15, 2020, but was considered quite unlikely. Only a few weeks later, attention shifted dramatically. On March 11, the World Health Organization characterised COVID-19 as a pandemic. While in the second quarter of 2020 in many



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111

countries – except notably in the US, Brazil, and some other countries – case and death growth rates had slowed down or reversed, at the end of June 2020, uncertainty is again rising as countries such as China experience new outbreaks and are again considering severe lockdowns. Especially in light of the possibility of a second pandemic wave, it is useful to look back and consider what can be learned from financial market responses to the first wave.

As a tool supporting decisions about public policy interventions but also private sector choices, asset price changes can be extremely valuable. In essence, asset markets provide ongoing, high-stakes surveys regarding future expected outcomes. For corporate decision-makers, it is especially important to learn from COVID-19 about what makes firms resilient when a tail risk is realised.

Although the focus currently is on COVID-19, it should be stressed that tail risks do exist in various domains. The lessons learnt from this pandemic are likely to be valuable also in the context of other tail risks, for instance those related to climate change or cybersecurity.

This paper begins by reviewing the worldwide stock-market development in section 2. Section 3 summarises which firms were most affected by the crisis. Section 4 reviews the stock-market based evidence on policy interventions. While virtually all research so far deals with the crisis period of the first quarter of 2020, section 5 provides insights on the recovery phase in the second quarter. Section 6 concludes.

2 Overall Stock Returns Over Time

This section documents some facts about the global stock market performance. It is important to distinguish different phases of the crisis. We follow Ramelli and Wagner (forthcoming) for details of the timing and expand the timeline of that study with newer data. Specifically, we organise our primary analysis along four periods: *Incubation* (Thursday, January 2 through Friday, January 17)¹, *Outbreak* (Monday, January 20 through Friday, February 21)², *Fever* (Monday, February 24 through Friday, March 20)³, and *Recovery* (Monday, March

We thank an anonymous reviewer for constructive comments.

1 On December 31, 2019, cases of pneumonia detected in Wuhan, China, were first reported to the WHO. On January 1, 2020, Chinese health authorities closed the Huanan Seafood Wholesale Market after it was discovered that wild animals sold there may be the source of the virus.

2 On January 20, Chinese health authorities confirmed human-to-human transmission of the Coronavirus, and the WHO issued the first situation report on the outbreak.

3 On February 23, Italy placed almost 50,000 people under strict lockdown in Lombardy, one of the country's most productive regions.

23 through June 8).⁴ Obviously, further updates may require the addition of a *Relapse* phase and other periods.

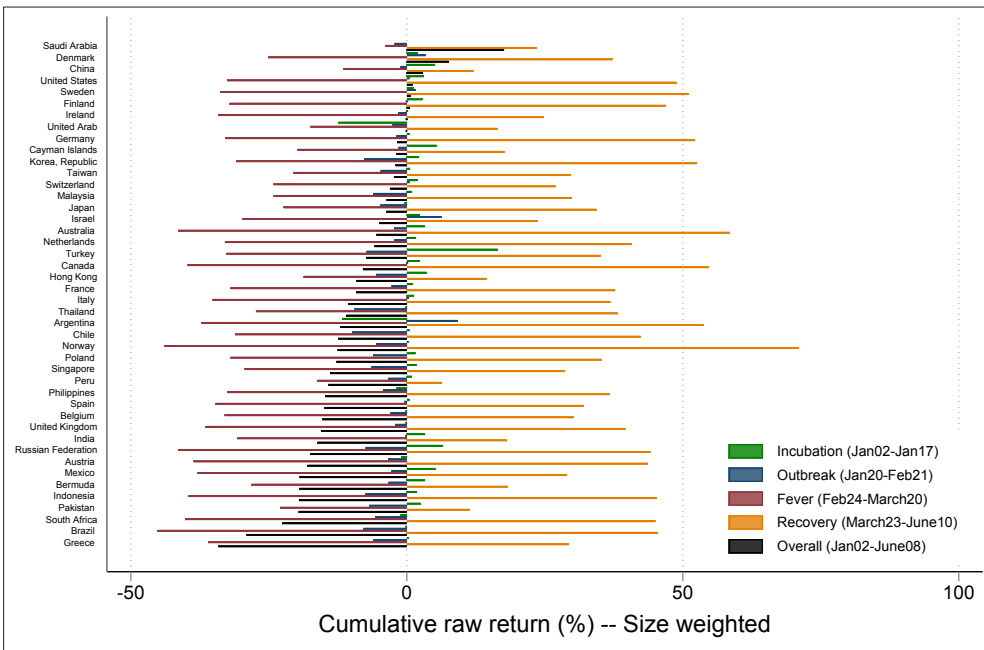
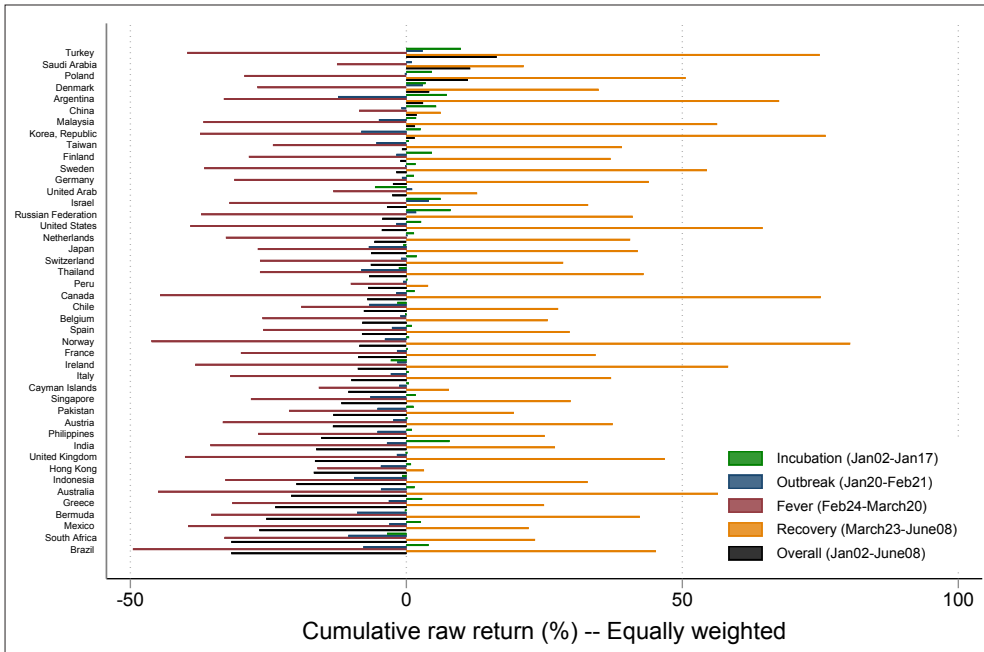
We retrieve daily stock prices for common shares from the Compustat North America and Compustat Global databases (from Wharton Research Data Services, WRDS). We adjust prices for dividends and stock splits, and we keep only common stocks listed on major stock exchanges in countries covered by the MSCI EQWI index (including both developed and developing countries).⁵ We convert all prices in USD, and we drop firms with less than USD10 million of market capitalisation as of December 31, 2019. We end up with a sample of around 31,200 firms headquartered in 90 different countries.

Figure 1a plots equally-weighted stock returns in USD across countries with at least 50 firms, while figure 1b plots the value-weighted ones.⁶ (Figures in local currency are available on request.) Several simple facts emerge. First, most countries saw their average firm decline in value over the almost two quarters under consideration (black bars). Second, the average firm performed best in Poland, Turkey, and Saudi Arabia, and worst in Mexico, South Africa, and Brazil. The best value-weighted performance occurred in Saudi Arabia, Denmark, and China; the worst in South Africa, Greece, and Brazil. Third, every single country experienced negative (positive) equal- and value-weighted average returns in the Fever (Recovery) periods [figs. 1a-b].

⁴ On Monday, March 23, the US Federal Reserve Board (Fed) announced a comprehensive bond purchase program (see § 4). The highest point that the S&P500 reached in June was obtained on June 8, so we stop this period then.

⁵ We defined major stock exchanges as in Chaieb, Langlois, Scaillet 2020.

⁶ We consider both equal- and value-weighted figures because of the recent tendency, at least in some countries, of a pronounced concentration of market values among a few companies.



Figures 1a-1b Cumulative returns across the world from January 2 through June 8, 2020

3 What Makes Firms Resilient Against Tail Risks? Learnings from COVID-19

Figures 1a and 1b confirm that COVID-19 had a tremendous effect on stock markets. While those figures highlight the average performance, COVID-19 has differentially affected the valuations of companies in the first quarter of 2020.

First, consider industry effects. In Ramelli and Wagner (forthcoming), we show that, in the US, telecom services, food and staples retailing, and utilities performed relatively well. Energy, consumer services, and transportation were among the biggest losers. As an ominous sign that the crisis was at least potentially wide-reaching, in the Fever period consumer services were among the biggest losers, and food and staples retailers were among the strongest winners (again, relatively speaking). The between-industry differences observed in the Fever period intuitively reflect different degrees of disruption in firms' operations caused by social distancing and lockdown measures.⁷ As shown in figure 2, similar considerations also emerge when looking at the between-industry performance in our international sample of firms [fig. 2].

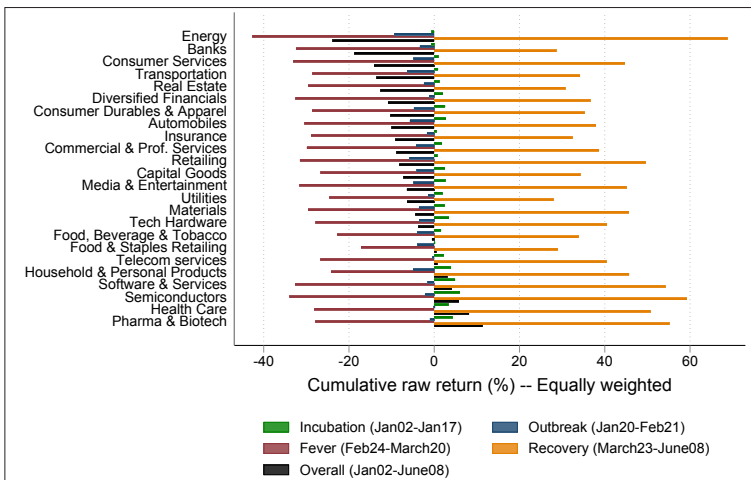


Figure 2 Stock returns by industry, international sample

⁷ Several measures of the extent to which job activities in different sectors can be carried out from home and without human interaction in physical proximity are now available (Dingel, Neiman 2020; Hensvik, Le Barbanchon, Rathelot 2020; Koren, Pető 2020). See Pagano, Wagner, Zechner 2020 for an analysis.

Second, especially in the Fever phase concerns about corporate debt (leverage) and corporate liquidity (cash holdings) started to play an important role (Ramelli, Wagner forthcoming). Figure 3 illustrates this result in the international sample, focusing on the return effects of being in the top quartiles of leverage or cash holdings [fig. 3]. Within the same industry and controlling for standard firm characteristics (size, book-to-market, and profitability), highly-indebted firms suffered severely in the Fever period; high-cash firms performed relatively better. Intuitively, high-cash firms are more likely able to survive and to preserve or expand their physical and human capital.⁸ Additionally, from a systemic perspective, the surge in the value of cash also suggests that as the crisis unfolded investors became increasingly concerned about a tightening of firms' access to external finance. The policy measures taken by central banks seek to address this concern; indeed, in the Recovery period, the effects of cash and leverage reversed. See sections 4 and 5 for more on this topic.

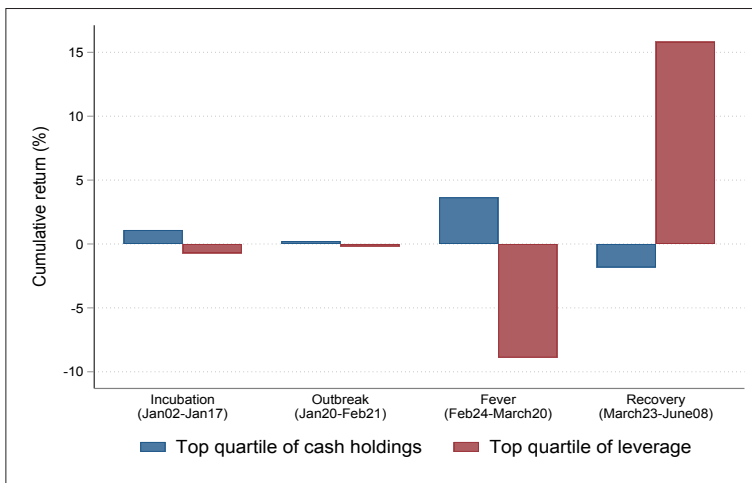


Figure 3 Relative cumulative performance of firms in the top quartile of cash holdings in percent of assets and in the top quartile of leverage, international sample

Third, the role of international trade has received surprisingly little attention. In Ramelli and Wagner (forthcoming), we document that US firms with more export or supply chain exposure to China experienced substantially lower cumulative abnormal returns during the Outbreak period, and to a lesser extent in the Incubation period.

⁸ Fahlenbrach, Rageth and Stulz (2020) confirm our results for the US sample. Ding et al. (2020) report similar results in international data.

More generally, internationally-oriented companies did poorly over these periods. Interestingly, when China seemed to get COVID-19 under control, whereas the situation in Europe and the US worsened, the effects reversed. This suggests that a second wave hitting specific countries might again see a drop in the value of firms relatively more exposed to those particular countries.

Fourth, besides ‘hard’ factors such as the degree of exposure to lockdown measures, financial strength, and reliance on international trade, some ‘softer’ factors may play an important role. For example, Albuquerque et al. (2020) and Garel and Petit-Romec (2020) document that stocks of firms with high environmental and social (ES) ratings fared better during the market turmoil. Li et al. (2020) show that stocks of firms with a strong corporate culture did better.

One natural question raised by these results is *which* investors valued which aspects and why. Our early-stage work in Glossner et al. (2020) suggests that institutional investors overall focused on hard measures of financial resilience and did *not* noticeably increase their stakes in high-ES firms (suggesting that retail investors may have been responsible for the strong performance of these companies).

4 Policy Interventions and Stock Price Reactions

Some interventions, such as lockdowns or stay-at-home orders, were directly aimed at containing the spread of the virus. The financial market responses to such interventions have been investigated in a number of studies. The first-order effect is negative for business according to some studies, at least in the short term, though these interventions do reduce infection and death rates (Barrot, Grassi, Sauvagnat 2020). However, because stock returns do respond to daily unanticipated changes in COVID-19 cases (Alfaro et al. 2020), such interventions can also have indirect beneficial effects for businesses (Ashraf 2020; Chen et al. 2020). Further research is needed to clarify the conditions under which interventions are (perceived as) harmful or beneficial to the value of firms.

There were important and novel interventions by central banks.⁹ For example, on Monday, March 23 the US Federal Reserve Board (Fed) announced two new facilities – the “Primary Market Corporate Credit Facility” and the “Secondary Market Corporate Credit Facility” – to support credit to large corporations at least up to the end of

⁹ The initial intervention by the US Federal Reserve Board to cut interest rates was met with a negative stock market response. Presumably, it was interpreted as a signal that the situation was about to get worse.

Q3 2020.¹⁰ On April 9, the Fed expanded those programs.¹¹ Considering short-term corporate bond reactions, D'Amico, Kurakula and Lee et al. (2020), Haddad, Moreira and Muir (2020) and Nozawa and Qiu (2020) find evidence in line with the notion that the Fed's actions enhanced overall economic prospects and thus reduced default risk of borrowers.¹² In Ramelli and Wagner (forthcoming), we find differentiated effects of the March 23 announcement. Stocks with high leverage and low cash-holdings initially benefited, but after ten days, the effect had reversed. Investors' concerns about corporate leverage and liquidity seem to have diminished somewhat after April 9, when the Fed announced a significant expansion of its programs. One difficulty in assessing the impacts of these measures is that there was also news about the spread of COVID-19, which would work against the potential positive effects of the Fed's intervention. The future will reveal the long-term effects of these interventions.¹³

There were also fiscal policy interventions. For example, Ashraf (2020) finds a neutral effect of income and debt relief support to households, whereas K.J. Heyden and T. Heyden (2020) find that the announcement of country-specific fiscal policy measures has negative effects on stock returns. Future research should investigate under which conditions such programs may have positive effects, and how different firms were affected by these various types of interventions.¹⁴

Finally, appropriate political communication is likely to have played a major role.¹⁵ Uncertainty plays a key role in the market response (Gormsen, Koijen 2020; Landier, Thesmar 2020). Political credibility and clear communication are key to reduce uncertainty on both the pandemic and the policy responses, and hence, in turn, to also support the proper functioning of financial markets.

¹⁰ <https://www.federalreserve.gov/newsevents/pressreleases/monetary20200323b.htm>.

¹¹ <https://www.federalreserve.gov/newsevents/pressreleases/monetary20200409a.htm>.

¹² Brunnermeier and Krishnamurthy (2020) provide a theoretical analysis.

¹³ Although large central banks' interventions in the corporate debt and equity markets can certainly help listed corporations accessing external capital, they may also have unintended effects in terms of pricing distortion. See, for instance, Barbon, Gianinazzi 2019.

¹⁴ For example, as described in Wagner, Zeckhauser, and Ziegler (2020), various provisions of the Tax Cuts and Jobs Act that had been relevant to stock price responses at the implementation of that Act were rolled back or altered by the CARES Act.

¹⁵ Coibion, Gorodnichenko and Weber (2020) provide survey evidence that household beliefs and spending plans do not appear to be affected much by policy responses. Interestingly, Hanspal, Weber and Wohlfart (2020) show that the stock market crash severely affected expectations of households, for example, regarding retirement age. Thus, tangible, realised losses do appear to shift household expectations. It will be interesting to see whether these expectations reverse as well as the market in the second quarter.

5 What is Behind the Exuberant Second Quarter of 2020?

The first quarter of 2020 saw extreme uncertainty and steep stock market declines. The real economy entered a state of emergency, unemployment soared in many countries, corporate earnings proved dismal, and double-digit percentage GDP drops never seen before occurred. Yet, in the Recovery period the stock market rose virtually everywhere.

Large stock price reversals were common across firms, as figure 4 illustrates. This figure is a binned scatter plot. We sort all 29,465 international firms for which data is available into 100 equal-sized bins of cumulative returns in the Fever period. The vertical axis plots the average cumulative returns in the Recovery period within each bin. The stock returns in the Recovery period strongly negatively correlate to those in the Fever period. Interestingly, companies that had small negative or even positive returns did not on average experience such a reversal [fig. 4].

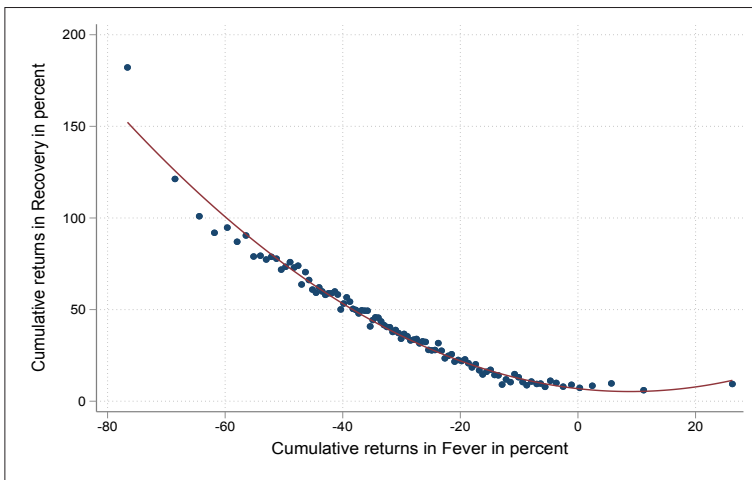


Figure 4 Returns in Fever and the Recovery Periods

How should one interpret the extraordinary market performance in the second quarter and the pattern in figure 4? This question will surely spur substantial future research. In the following, we suggest a few possible explanations which might be worth further investigating (and which may not be mutually exclusive).

First, suppose that investors genuinely expected the worst to be over, and hence inferred that valuations at the end of the second quarter should be back to their pre-crisis levels (or slightly higher,

as investors also need to earn their cost of capital). Simple arithmetic then yields a shape consistent with the one plotted in figure 4.¹⁶ Intuitively, a stock that falls by 50% has to rise by 100% to get back to the initial level, whereas a stock that falls by 10% only has to rise by 11.1%. Notice that for this *Recovery Arithmetic* to be a candidate explanation, investors would need to see both expected future cash flows and uncertainty at similar levels as in the pre-crisis period. While it is plausible that discount factors substantially declined during the second quarter, general macroeconomic forecasts remain dismal in many countries.

Second, figure 4 shows that the few firms that had been winners in the Fever period and had exhibited positive returns do not, in fact, on average show negative returns in the Recovery period (as they would under the Recovery Arithmetic). This finding may reflect sustained and structural changes in the economy and in how we live and work, which give especially certain technology companies enormous advantages.

Third, the medium-term stock price reaction to the Fed's intervention announcements may drive the returns. In other words, the Fed is providing enormous liquidity and is indirectly supporting also firms that did not suffer that much in the Fever period. (There is no official distinction by industry in the Fed's bond purchase programs, for example.) This would also imply that there is distortion in market prices away from fundamentals.

Fourth, the Recovery returns may be driven by individual investors, who may have 'bought the dip' gambling on the rebound of stock prices perhaps amplified by a prolonged intervention of the Fed into capital markets.¹⁷

In work in progress, we are seeking to distinguish these explanations, in particular with the goal of determining the relative importance of fundamentals versus liquidity provided by central banks in driving assets prices.

16 Consider a stock with an annual cost of equity of $k\%$. Suppose for simplicity that the stock pays no dividend. Roughly, we would expect a price appreciation for that stock for the first two quarters of $0.5 \cdot k\%$. Suppose the stock price change in the first quarter (or in the Fever period, assuming things were flat before) was $f\%$ (where for most stocks, $f < 0$). Then, to get to the expected price target by the end of Q2, the stock price change in the Recovery period would need to be $r = (1 + 0.5 \cdot k) / (1 + f)$. Plotting this relationship with r on the vertical axis and f on the horizontal axis yields a non-linear relationship such as figure 4.

17 In Glossner et al. (2020) we find that investors on "Robinhood" (a low-cost platform increasingly popular among retail investors) tended to increase holdings in high-leverage and low-cash holdings during the first quarter of 2020. Thus, these investors targeted companies that suffered heavily in the Fever period; conversely, they may, therefore, have done very well in the Recovery period.

6 Implications for Business and Public Policy

It is far too early to declare that an end is in sight for the COVID-19 pandemic. While the stock market, as a forward-looking device, has been sending positive signals through the steep rise in the second quarter of 2020, valuations remain tenuous. A resurgence of uncertainty may lead to another round of sharp drops in equity markets. Thus, it is not clear whether the second quarter was indeed a sustainable recovery, or just a temporary phase before a heavy relapse or perhaps even a devastating collapse.

Regardless, for corporate decision-makers and policy-makers, some lessons of the first quarter 2020 are already clear. A powerful driver of corporate resilience – which, in turn, helps also to secure jobs and sustain the broader economy – has been a sufficiently strong financial position before the pandemic hit. Worryingly, the COVID-19 crisis is leading to a substantial increase in both corporate and public debt, which will potentially exacerbate the existing fragilities of the financial markets. A critical policy objective will be to find new ways to reduce these fragilities.

Bibliography

- Albuquerque, R.A.; Koskinen, Y.; Yang, S.; Zhang, C. (2020). “Resiliency of Environmental and Social Stocks: An Analysis of the Exogenous COVID-19 Market Crash”. European Corporate Governance Institute – Finance Working Paper No. 676/2020. <https://dx.doi.org/10.2139/ssrn.3583611>.
- Alfaro, L.; Chari, A.; Greenland, A.N.; Schott, P.K. (2020). “Aggregate and Firm-Level Stock Returns During Pandemics, in Real Time”. NBER Working Paper No 26950. <https://www.nber.org/papers/w26950>.
- Ashraf, B.N. (2020). “Economic Impact of Government Interventions During the COVID-19 Pandemic: International Evidence from Financial Markets”. *Journal of Behavioral and Experimental Finance*, 27, 100371. <https://doi.org/10.1016/j.jbef.2020.100371>.
- Barbon, A.; Gianinazzi, V. (2019). “Quantitative Easing and Equity Prices: Evidence from the ETF Program of the Bank of Japan”. *Review of Asset Pricing Studies*, 9, 210–55. <https://doi.org/10.1093/rapstu/raz008>.
- Barrot, J.-N.; Grassi, B.; Sauvagnat, J. (2020). “Estimating the Costs and Benefits of Mandated Business Closures in a Pandemic”. CEPR Discussion Paper No. DP14757.
- Brunnermeier, M.; Krishnamurthy, A. (2020). “Corporate Debt Overhang and Credit Policy”. Brookings Papers on Economic Activity June 25, 2020. <https://www.brookings.edu/wp-content/uploads/2020/06/Brunnermeier-Krishnamurthy-conference-draft.pdf>.
- Chaieb, I.; Langlois, H.; Scaillet, O. (2020). “Factors and Risk Premia in Individual International Stock Returns”. Swiss Finance Institute Research Paper No. 18-04. <https://dx.doi.org/10.2139/ssrn.3103752>.

- Chen, C.; Dasgupta, S.; Huynh, T.D.; Xia, Y. (2020). "Were Stay-at-Home Orders During Covid-19 Harmful for Business? – The Market's View". <https://cepr.org/content/covid-economics-vetted-and-real-time-papers-0>.
- Coibion, O.; Gorodnichenko, Y.; Weber, M. (2020). "Does Policy Communication during COVID Work?". <https://cepr.org/content/covid-economics-vetted-and-real-time-papers-0>.
- D'Amico, S.; Kurakula, V.; Lee, S. (2020). "Impacts of the Fed Corporate Credit Facilities through the Lenses of ETFs and CDX". Federal Reserve Bank of Chicago, Working paper 2020-14. <https://doi.org/10.21033/wp-2020-14>.
- Ding, W.; Levine, R.; Lin, C.; Xie, W. (2020). "Corporate Immunity to the COVID-19 Pandemic". Working paper. <http://dx.doi.org/10.2139/ssrn.3578585>.
- Dingel, J.I.; Neiman, B. (2020). "How Many Jobs Can be Done at Home?". Becker Friedman Institute, White Paper. https://bfi.uchicago.edu/wp-content/uploads/BFI_White-Paper_Dingel_Neiman_3.2020.pdf.
- Fahlenbrach, R.; Rageth, K.; Stulz, R.M. (2020). "How Valuable is Financial Flexibility when Revenue Stops? Evidence from the COVID-19 Crisis". NBER Working Paper No. 27106. <https://www.nber.org/papers/w27106>.
- Garel, A.; Petit-Romec, A. (2020). "Investor Rewards to Environmental Responsibility: Evidence from the COVID-19 Crisis". <https://cepr.org/content/covid-economics-vetted-and-real-time-papers-0>.
- Glossner, S.; Matos, P.; Ramelli, S.; Wagner, A.F. (2020). "Where Do Institutional Investors Seek Shelter When Disaster Strikes? Evidence from COVID-19". https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3655271.
- Gormsen, N.J.; Koijen, R.S.J. (2020). "Coronavirus: Impact on Stock Prices and Growth Expectations". NBER Working Paper No. 27387. <https://www.nber.org/papers/w27387>.
- Haddad, V.; Moreira, A.; Muir, T. (2020). "When Selling Becomes Viral: Disruptions in Debt Markets in the COVID-19 Crisis and the Fed's Response". NBER Working Paper No. 27168. <https://www.nber.org/papers/w27168>.
- Hanspal, T.; Weber, A.; Wohlfart, J. (2020). "Exposure to the Covid-19 Stock Market Crash and Its Effect on Household Expectations". SAFE Working Paper No. 279. <https://dx.doi.org/10.2139/ssrn.3577217>.
- Hensvik, L.; Le Barbanchon, T.; Rathelot, R. (2020). "Which Jobs Are Done from Home? Evidence from the American Time Use Survey". IZA Discussion Paper No. 13138. <https://www.iza.org/publications/dp/13138>.
- Heyden, K.J.; Heyden, T. (2020). "Market Reactions to the Arrival and Containment of COVID-19: An Event Study". Working paper. <https://dx.doi.org/10.2139/ssrn.3587497>.
- Koren, M.; Pető, R. (2020). "Business Disruptions from Social Distancing". <https://arxiv.org/abs/2003.13983v1>.
- Landier, A.; Thesmar, D. (2020). "Earnings Expectations in the COVID Crisis". NBER Working Paper No. 27160. <https://www.nber.org/papers/w27160>.
- Li, K.; Liu, X.; Mai, F.; Zhang, T. (2020). "The Role of Corporate Culture in Bad Times: Evidence from the COVID-19 Pandemic". Working paper. <https://dx.doi.org/10.2139/ssrn.3632395>.

- Nozawa, Y.; Qiu, Y. (2020). "The Corporate Bond Market Reaction to Quantitative Easing During the COVID-19 Pandemic". Working paper. <https://dx.doi.org/10.2139/ssrn.3579346>.
- Pagano, M.; Wagner, C.; Zechner, J. (2020). "Disaster Resilience and Asset Prices". CSEF Working Paper No. 563. <http://www.csef.it/WP/wp563.pdf>.
- Ramelli, S.; Wagner, A.F. (forthcoming). "Feverish Stock Price Reactions to COVID-19". *Review of Corporate Finance Studies*.
- Wagner, A.F.; Zeckhauser, R.J.; Ziegler, A. (2020). "The Tax Cuts and Jobs Act: Which Firms Won? Which Lost?". HKS Working Paper No. RWP20-018. <https://www.hks.harvard.edu/publications/tax-cuts-and-jobs-act-which-firms-won-which-lost#citation>.
- World Economic Forum (2020). "The Global Risks Report 2020". January 15. <https://www.weforum.org/reports/the-global-risks-report-2020>.

